Ground Water
of Vermont
A Division of Marin Environmental, Inc.

2 October, 1996

Mr. Matt Moran
State of Vermont DEC
Waste Management Division
103 South Main Street, West Building
Waterbury, Vermont 05671-0404

RE: Road Res-Q, Expressway Investigation Report
(VT DEC Site # 96-1993)

Dear Mr. Moran,

Enclosed is one bound copy of the Initial Site Investigation Report for Road Res-Q located in Essex Junction, Vermont.

Please call me if you have any questions or comments regarding this report.

Sincerely,

Robert J. Ross, CGWP
Hydrogeologist

cc: Shawn Bushey - Road Res-Q

enclosure

Ref: 96058C02.DOC

One Mill Street, Box C-5 • Burlington, VT 05401 • (802) 860-6065 • Fax (802) 860-6076

INITIAL SITE INVESTIGATION REPORT

ROAD RES-Q
1 Main Street
Essex Junction, Vermont

(VT DEC SITE #96-1993)

2 October 1996

Prepared for:

Road Res-Q
1 Main Street
Essex Junction, Vermont 05452

Contact:
Shawn or Amanda Bushey
Phone: 802-879-7577

Prepared by:

Ground Water of Vermont
1 Mill Street, Box C-5
Burlington, VT 05401

Contact: Robert J. Ross, CGWP
Phone: 802-860-6065

GWV Project #: V96-058
GWV Document #: 96058R01.DOC

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EXECUTIVE SUMMARY

Ground Water of Vermont (GWV) has conducted an initial site investigation at the Road Res-Q property located in Essex Junction, Vermont and has concluded the following:

- Gasoline appears to have been released to the subsurface at the site. Soils in the vicinity of the removed gasoline underground storage tanks (USTs) had elevated photoionization detector (PID) readings and gasoline compounds were detected at levels above Vermont Ground Water Enforcement Standards (VGES) in ground water at the site. No potential upgradient sources have been identified.
- The lateral extent of dissolved-phase contamination has not been determined. Contamination appears to be migrating in the direction of ground water flow, which is to the south-southeast, at a very low gradient of 0.3 percent.
- Observations made during the UST closure and the distribution of the dissolved-phase contamination suggest that the subsurface contamination was principally due to releases in the vicinity of the former gasoline USTs.
- Subsurface contamination at the site does not appear to pose a threat to sensitive receptors near the site. PID screening of ambient air inside the basement of the Law Office of Philip A. Kolvoord on 13 August 1996 did not indicate the presence of VOCs and no buried sewer lines or storm water drainage lines are located downgradient of the source area.
- No drinking-water supplies appear to be at risk from the contamination identified on site.

On the basis of the results of this investigation, GWV makes the following recommendations:

1. One additional soil boring / monitoring well should be installed to define the extent of dissolved-phase contamination downgradient of the source area.
2. Water samples should then be collected for analysis of BTEX compounds and MTBE by EPA Method 8020 from all monitoring wells that do not contain free product.
3. During the next site visit, PID readings should be obtained of ambient air in the basement of the Law Office building to confirm previous findings and to evaluate the potential for migration of contaminated soil vapors into the basement.
4. At this time, GWV does not believe that active remediation of the site is warranted, but quarterly ground water sampling and analysis for one year will likely be necessary to monitor water quality trends.

1.0 INTRODUCTION

This report details the results of an initial site investigation conducted at the Road Res-Q facility located on the eastern corner of Vermont Routes 117 and 15 in the Village of Essex Junction, Vermont (Figure 1). This report has been prepared by Ground Water of Vermont (GWV) for Road Res-Q under the direction of Shawn and Amanda Bushey. The site investigation was initiated with Vermont Department of Environmental Conservation (VT DEC) approval following the discovery of subsurface petroleum contamination during the removal of six underground storage tanks (USTs) on April 29, 30, and May 1, 1996.

1.1 Site Location and Physical Setting

The site is occupied by one single-story building, which consists of a two-bay automotive service garage and an office. The ground surface, most of which is paved, is relatively flat with an average elevation of 320 feet above mean sea level. Surface drainage appears to be controlled by the slope of the pavement and the on-site storm-water system. The presumed direction of ground-water flow in the area is toward the south, in the general direction of the Winooski River. The nearest surface-water body is an unnamed tributary to the Winooski River that is located about 1,500 feet south of the site. The Winooski River is located about 2,200 feet south of the site.

Drinking water for the site and other surrounding buildings is supplied by a public water system, which is managed by the Lake Champlain Water District. The site and all buildings in the vicinity are served by a municipal waste-water system. Numerous underground utilities are located on the site and adjacent properties. Storm-water drains and drainage lines are located on the northern portion of the property along Vermont Route 15 and a main water line is located along Vermont Route 117, which forms the southern boundary of the property. Several other buried utility lines for electricity, natural gas, and water are located behind the Road Res-Q building to the southeast.

Native surficial materials in the vicinity of the site are mapped as pebbly marine sand deposits (Stewart and MacClintock, 1970). Bedrock in the area is mapped as the Sweetsburg Formation, which is composed of the Skeels Corners slate and Mill River conglomerate consisting of black slate, dolomite, sandstone, limestone and calcareous shale of middle Cambrian age. The site is situated between the Hinesburg thrust fault and a smaller unnamed thrust fault, which are both within a quarter mile of the site (Doll, 1961).

1.2 Site History

The site is currently owned by Shawn Bushey. Mr. Bushey leased the property from Mobil Oil Corporation between 1978 and 1985, before purchasing the property from Mobil in 1985. Between 1970 and 1978 the property was leased from Mobil by Shawn's father, Mr. Delore Bushey. According to Shawn Bushey, the site has a long history of petroleum operations under Mobil's ownership dating back to at least the late 1930s.

Six petroleum USTs (two 4,000-gallon gasoline, two 3,000-gallon gasoline, one 550-gallon heating-oil, and one 550-gallon waste-oil) owned by Road Res-Q were removed on April 29, 30, and May 1, 1996 by Pollution Solutions of Vermont (PSOV) of Williston, Vermont. An

UST closure assessment was performed by Twin State Environmental Corporation (TSEC) on the days of removal. TSEC submitted an UST closure report, dated 3 May 1996, to Mr. Bushey and the VT DEC.

Both of the 3,000-gallon gasoline USTs and one of the 4,000-gallon gasoline USTs were found to be in good condition upon removal, with no evidence of rust, pitting, or holes. The 550-gallon waste-oil and heating-oil USTs were also found to be in relatively good condition, with no evidence of rust, pitting, or holes. However, one of the 4,000-gallon gasoline USTs was found to have a hole, approximately one-half inch in diameter, in the bottom of the tank directly beneath the fill pipe. The TSEC closure report does not include a discussion about the condition of the UST piping for any of the tanks nor does it mention the two pump islands that were removed from the site.

Based on the TSEC closure report, the excavation for the USTs measured approximately 50 feet long by 18 feet wide and 12 feet deep. Soils encountered within the excavation were reportedly unsaturated fill material down to a maximum depth of 12 feet. During removal of the USTs, soil samples from the excavation were screened for the possible presence of volatile organic compounds (VOCs) using a photoionization detector (PID). According to the TSEC closure report, PID readings of soil samples collected from the UST excavation ranged from less than 0.1 to 727 parts per million (ppm). PID readings of soil samples collected from the northern and southern ends of the excavation were less than 0.1 ppm. The highest PID readings were measured on soil samples collected at the bottom of the excavation at a depth of 12 feet.

Following the removal of the 550-gallon waste-oil UST, TSEC collected one soil sample for laboratory analysis, which included VOCs by EPA Method 8240 and polynuclear aromatic hydrocarbons (PAHs) by EPA Method 8100. No VOCs were identified in this soil sample; however, several PAH compounds were detected including: benzo(a)pyrene at 52.4 ppb, fluoranthene at 156 ppb, phenanthrene at 65.2 ppb, and pyrene at 147 ppb. It should be noted that the VT DEC typically requires total petroleum hydrocarbon (TPH) analysis using a modified EPA Method 8100 for soil from a waste-oil UST, not PAH analysis by EPA Method 8100. It is not unusual to find low concentrations of PAH compounds, such as those detected in the on-site soil sample, in soil samples collected at petroleum release sites since petroleum products are a complex mixture of numerous hydrocarbon compounds.

GWV initiated an initial site investigation after receiving approval on 19 July 1996 from Ms. Amanda Call Bushey of Road Res-Q and Matthew Moran of the VT DEC.

1.3 Objectives and Scope of Work

The objectives of this initial site investigation were to:

- Evaluate the degree and extent of petroleum contamination in soil and ground-water;
- Qualitatively assess the risks to the environment and public health via relevant sensitive receptors and potential contaminant migration pathways; and
- Identify potentially appropriate monitoring and/or remedial actions based on the site conditions.

To accomplish these purposes, GWV has:

- Reviewed existing historical site data.
- Supervised the installation of four soil borings / monitoring wells, and determined the local ground-water flow direction, gradient and approximate velocity.
- Screened subsurface soils from the soil borings for the possible presence of volatile organic compounds (VOCs) using a photoionization detector (PID).
- Collected and submitted ground-water samples from the on-site monitoring wells for laboratory analysis of VOCs.
- Identified sensitive receptors in the area, and assessed the risk posed by the contamination to these potential receptors.
- Evaluated the need for treatment and/or a long-term monitoring plan for the site.
- Prepared this summary report, which details the work performed, qualitatively assesses risks, provides conclusions and offers recommendations for further action.

2.0 INVESTIGATIVE PROCEDURES AND RESULTS

2.1 Soil Boring / Monitoring Well Installation

On 6 August 1996, GWV supervised the completion of four soil borings and monitoring wells (MW-1 through MW-4). MW-1 was placed within the excavated area of the former waste-oil UST. MW-2 was placed within the excavated area of the former 3,000-gallon USTs. MW-3 was located approximately 5 feet southwest of the former UST location in the presumed downgradient direction. MW-4 was located approximately 30 feet west of the excavated area near one of the pump islands. Well locations are shown on Figure 2 in Appendix A. The soil borings and monitoring wells were installed using a vibratory drilling technique by Adams Engineering of Underhill, Vermont.

The soils encountered in each boring generally consisted of about 10 feet of fill material overlying saturated coarse sands. Black stained soil, characteristic of weathered gasoline, was present in each boring generally between 10 to 15 feet below ground surface (bgs). Each boring was completed to a depth of about 18 feet bgs. Ground water was encountered in each boring between 10 and 15 feet bgs. Soil samples were collected continuously from each boring using a five-foot-long core tube. Recovery was very good, generally between 80 and 100 percent. The core-tube samples were screened for the possible presence of VOCs with a photo-ionization detector (PID) and logged for lithology by a GWV field geologist. All downhole drilling and sampling equipment was decontaminated during use as appropriate.

Two-inch-diameter PVC monitoring wells with 10 feet of 0.010-inch slots were installed to approximately 17 feet bgs at each of the boring locations. The tops of the screen sections were set about three feet above the ground-water surface in order to accommodate seasonal ground-water level fluctuations and to allow for the measurement of possible free-phase petroleum product. Sections of solid PVC were added to bring the tops of the well casings to approximately 0.5 feet bgs. Clean silica #1 filter sand was placed in the borehole annulus around each well to nominally one foot above the slotted interval. A bentonite pellet seal, at least one-foot thick, was set above the sand pack and the remainder of the annular space was

backfilled with native material. Each completed monitoring well was protected by a flush-mounted steel roadbox cemented into place. Each well casing was topped with a water-tight compression cap. Monitoring-well construction details are included on the soil-boring and well-construction logs in Appendix B.

All of the monitoring wells were developed by peristaltic pump following installation on 6 August 1996. Each monitoring well produced moderate amounts of water and cleaned up relatively quickly. Development water was discharged directly to the ground surface in the vicinity of each well.

2.2 Soil-Screening Results

PID readings on soil samples collected from the four soil borings ranged between 2.2 and 409 parts per million (ppm), with the highest PID readings encountered at the water table in each boring. PID readings within the unsaturated zone ranged from 0.1 to 409 ppm. Strong petroleum odors and visible evidence of petroleum staining were noted at each location during soil boring activities. PID screening results are included on the boring logs in Appendix B.

The GWV field geologist screened soil samples from each soil boring for the possible presence of volatile organic compounds (VOCs), using a Thermo Environmental Model 580B portable photoionization detector (PID). The PID was calibrated with an isobutylene standard gas to a benzene reference.

2.3 Determination of Ground-Water Flow Direction and Gradient

Ground water in the unconfined surficial aquifer directly beneath the site appears to be flowing in a south-southeasterly direction, as originally presumed. The average gradient of the local ground-water table on 30 August 1996 was about 0.3 percent. Average flow velocities in the ground water moving through the coarse sand deposits are estimated to be in the range of 0.5 to 26 feet per day (ft/day). Water-level measurements and elevation calculations for 30 August 1996 are presented in Table 1. The ground-water contour map in Figure 3 was prepared using this data.

Fluid levels were measured in the three monitoring wells on 30 August 1996. The depth to water varied from 10.05 feet (MW-3) to 11.18 feet (MW-1) below top-of-casing. No free-phase gasoline was observed in any of the on-site monitoring wells. Static water-table elevations were computed for each monitoring well by subtracting the measured depth-to-water readings from the surveyed top-of-casing elevations, which are relative to an arbitrary site datum of 100.00 feet.

The shallow aquifer at the site consists predominantly of coarse sands, which typically exhibit effective porosities of about 0.2 to 0.4 and hydraulic conductivities of about 0.3 to 17 ft/day (Domenico and Schwartz, 1990). Assuming Darcian flow, these estimated ranges of porosity and conductivity combine with the calculated ground-water gradient of 0.3 percent to yield an estimated range of ground-water flow velocities in the surficial aquifer of between 0.5 and 26 ft/day.

2.4 Ground-Water Sampling and Analysis

Review of the ground-water analytical results indicates that residual ground-water contamination at the site extends an unknown distance to the south. The highest dissolved-phase concentrations were detected in MW-2, located within the excavated area of the former 3,000-gallon gasoline USTs. The Vermont Groundwater Enforcement Standards (VGESs)[1] for all of the BTEX (benzene, toluene, ethylbenzene, and xylenes) compounds and the Vermont Health Advisory (VHA) for methyl-tertiary butyl ether (MTBE) were exceeded in the sample collected from MW-2. The VGESs for benzene, ethylbenzene, and xylenes were exceeded at MW-3. The VGESs were also exceeded for ethylbenzene and xylenes at MW-4 and for xylenes at MW-1. Ground-water analytical results are summarized in Table 2. A contaminant distribution map of total BTEX and MTBE is presented as Figure 4. Laboratory report forms are included in Appendix C.

The sample from MW-1 (located in the former waste-oil UST pit) was also analyzed for the possible presence of polynuclear aromatic hydrocarbons (PAHs), which identified the presence of 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene at 39.9, 91.7, and 277 ppb, respectively. There are no State or Federal standards for 1-methylnaphthalene, and 2-methylnaphthalene, although there is a VHA of 20 ppb for naphthalene. The presence of 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene in the sample from MW-1 are more closely associated with gasoline than waste oil. The relative concentration ratios of the PAHs detected in the sample from MW-1 are also more indicative of a gasoline release than a waste oil release: naphthalene at the highest concentration, followed by 2-methylnaphthalene, and then 1-methylnaphthalene (Thomas and Delfino, 1991). The PAH analytical results are summarized in Table 2; laboratory report forms are included in Appendix C.

Ground-water samples were collected from the on-site monitoring wells on 13 August 1996. Each monitoring well was purged and then sampled using the dedicated bailer and dropline left hanging inside the well casing following development. Purge water was discharged directly to the ground in the vicinity of each well. Trip blank and duplicate samples were collected for quality assurance/quality control (QA/QC) purposes. All field procedures were conducted in accordance with GWV standard protocols.

The ground-water samples were submitted to Endyne, Inc. of Williston, Vermont where they were analyzed for the possible presence of benzene, toluene, ethylbenzene, xylenes (BTEX) and methyl-tertiary butyl ether (MTBE) by EPA Method 8020. One sample (MW-1) was also analyzed for the possible presence of polynuclear aromatic hydrocarbons (PAHs) by EPA Method 8100. Analytical results from the QA/QC samples indicate that adequate QA/QC was maintained during sample collection and analysis. None of the BTEX compounds or MTBE were detected in the trip blank and the analytical results for the blind field duplicate sample fell within about two to eight percent of the original sample results.

[1]The Vermont DEC has established Groundwater Enforcement Standards (VGESs) for four petroleum related VOCs, as follows: benzene - 5 ppb; toluene - 2,420 ppb; ethylbenzene - 680 ppb; and xylenes - 400 ppb. The Vermont Health Advisory (VHA) for MTBE, a gasoline additive, has been established as 40 ppb. The VHA for naphthalene, a constituent of gasoline, has been established as 20 ppb.

3.0 SENSITIVE RECEPTOR SURVEY AND RISK ASSESSMENT

3.1 Sensitive Receptor Survey

GWV conducted a survey to identify sensitive receptors in the vicinity of the site that could potentially be impacted by vapor or dissolved-phase gasoline contamination. The following sensitive receptors were identified in the vicinity of the site:

- The basement of the adjacent off-site building, located approximately 30 feet north of the former USTs, which is occupied by the Law Office of Philip A. Kolvoord.
- The on-site sewer and storm water drainage systems located adjacent to the former USTs.
- Direct contact with contaminated soils and ground water.

The on-site building does not have a basement, as it is constructed on an at-grade concrete slab.

3.2 Risk Assessment

GWV assessed the risks that the subsurface contamination poses to the receptors identified above. In general, human exposure to petroleum related contamination is possible through inhalation, ingestion, or direct contact while impacts to environmental receptors are due either to a direct release or contaminant migration through one receptor to another or along a preferential pathway.

The findings of our risk assessment indicate that the subsurface contamination at the site does not appear to pose a significant threat to any nearby sensitive receptors. Indoor air quality in the basement of the adjacent off-site building does not appear to have been impacted, and the threat of direct human contact with contaminated ground water or soils at the site is low due the depths of the contaminated media and planned presence of asphalt pavement over the contaminated area. Exposure to contaminated soils would be possible; however, if excavation or other subsurface work is conducted in the immediate vicinity of the site. The accumulation of vapor-phase contamination in the on-site storm water drainage and sewer systems is considered unlikely due to the fact that these systems are not located in areas of shallow soil contamination. The seepage of contaminated ground water into these systems is considered unlikely due to the shallow depth of these systems relative to the ground water elevation. Drinking water for the site and surrounding businesses and homes is supplied by a public water system, whose primary source of water is Lake Champlain.

3.2.1 Indoor Air Quality

Residual contamination at the site could pose a threat to human health via inhalation of contaminated vapors in the basement of an adjacent building, currently occupied by the Law Office of Philip A. Kolvoord. Subsurface structures such as basements, crawl spaces

and sewer lines often act as preferential pathways for vapor migration due to the presence of relatively lower pressure in the structure than that found in the surrounding soils.

The risk of human exposure via inhalation of contaminated air in the basement of the Law Office building does not appear to be significant at this time, however. The Law Office building is upgradient from the site, and no buried utilities run through the contaminated area between the two buildings. During a site visit on 13 August 1996, no odors were identified in the basement of the adjacent building, and PID readings of ambient air in the basement showed no detectable levels of VOCs. This information suggests that the law office basement is not at significant risk of impact from contamination at the site.

3.2.2 Direct Soil / Ground-Water Contact

The risk of human exposure through direct contact with contaminated soils is considered to be low at the site, considering that the former location of the USTs will be covered by pavement and a majority of the petroleum contaminated soils are located at a depth greater than 3 feet bgs. However, direct contact with potentially contaminated soil is possible, if any subsurface exploratory or construction work is conducted in the vicinity of the site. The risk of human exposure through direct contact with contaminated ground water is considered to be very low at the site, considering that the depth to ground water is greater than 10 feet bgs.

3.2.3 Surface-Water Quality

The nearest surface water body is an unnamed tributary to the Winooski River that is located approximately 1,500 feet south of the Road Res-Q property. Current information suggests that it is unlikely that contamination from the site has migrated to this surface water body.

3.2.4 Drinking Water Supplies

Although the shallow surficial aquifer adjacent to and downgradient of the former USTs has been impacted by petroleum contamination, current information suggests that no drinking water supplies are at risk. Drinking water for the site and other surrounding buildings is supplied by a public water system, which is managed by the Lake Champlain Water District.

3.2.5 Confined Spaces and Underground Utilities

The accumulation of gasoline vapors in confined spaces or underground utilities such as basements, crawl spaces and sewer lines, could be an explosion hazard, if a significant amount of vapors were to accumulate and an ignition source was also present. The accumulation of vapor-phase contamination in the on-site storm-water drainage and sewer systems does not appear to be a concern at the site, considering that no buried storm-water drainage or sewer lines are located within the shallow contaminated soil. Seepage of contaminated ground water into buried storm-water drain or sewer lines is also unlikely due to the shallow depth of these systems relative to the ground-water elevation.

4.0 CONCLUSIONS

Based on the results of the site investigation described above, GWV concludes the following:

1. Gasoline appears to have been released to the subsurface at the site. Soils in the vicinity of the removed gasoline underground storage tanks (USTs) had elevated photoionization detector (PID) readings, and gasoline compounds were detected at levels above Vermont Ground Water Enforcement Standards (VGES) in ground water at the site. No potential upgradient sources have been identified.
2. Observations made during the UST closure and the distribution of dissolved-phase contamination suggest that the subsurface contamination is principally due to gasoline releases in the vicinity of the former gasoline USTs.
3. The lateral extent of dissolved-phase contamination has not been determined, but the contamination appears to be migrating to the south-southeast in the direction of ground water flow.
4. The PAH compounds detected in the ground-water sample from MW-1 appear to be related to gasoline released in the area, not from the removed waste-oil UST.
5. Subsurface contamination at the site does not appear to pose a threat to indoor air quality in the adjacent building occupied by the Law Office of Philip A. Kolvoord. PID screening of ambient air inside this basement on 13 August 1996 did not indicate the presence of VOCs, this building appears to be upgradient from the site, and no buried utilities run directly from this building through areas of identified contamination.
6. Subsurface contamination at the site does not currently appear to present a significant risk of gasoline vapor accumulation in sewer lines or the storm-water drainage system.
7. No drinking-water supplies appear to be at risk from the contamination identified on site.
8. Surficial materials at the site consist of approximately 10 feet of fill material overlying saturated deposits of coarse sand. On 30 August 1996, the water table was found to be about 10 feet below ground surface, and exhibited a south-southeasterly trending gradient of about 0.3 percent. The representative range of ground-water flow velocities are expected to be between 0.5 and 26 feet per day.

5.0 RECOMMENDATIONS

On the basis of the results of this investigation and the conclusions stated above, Ground Water of Vermont recommends the following:

1. One additional soil boring/monitoring well should be installed at the site downgradient of the former USTs to evaluate the extent of dissolved-phase contamination.
2. The proposed and existing monitoring wells should be sampled and analyzed for BTEX compounds and MTBE by EPA Method 8020.
3. During the next visit, PID readings should be obtained of ambient air in the basement of the Law Office building to confirm the previous findings and to further evaluate the potential for migration of contaminated soil vapors into the basement.

At this time, available information does not indicate that active site remediation is warranted; however, additional work is necessary to evaluate the downgradient extent of ground-water contamination. Current information suggests that the appropriate course of action for the site, will consist of quarterly monitoring of ground water for one year in order to evaluate contaminant trends and seasonal fluctuations of ground-water quality.

6.0 REFERENCES

Doll, C.G. and others, 1961. *Geologic Map of Vermont*, Office of the State Geologist.

Domenico, P.A., and Schwartz, F.W., 1990. *Physical and Chemical Hydrogeology*, John Wiley and Sons, New York, 824 p.

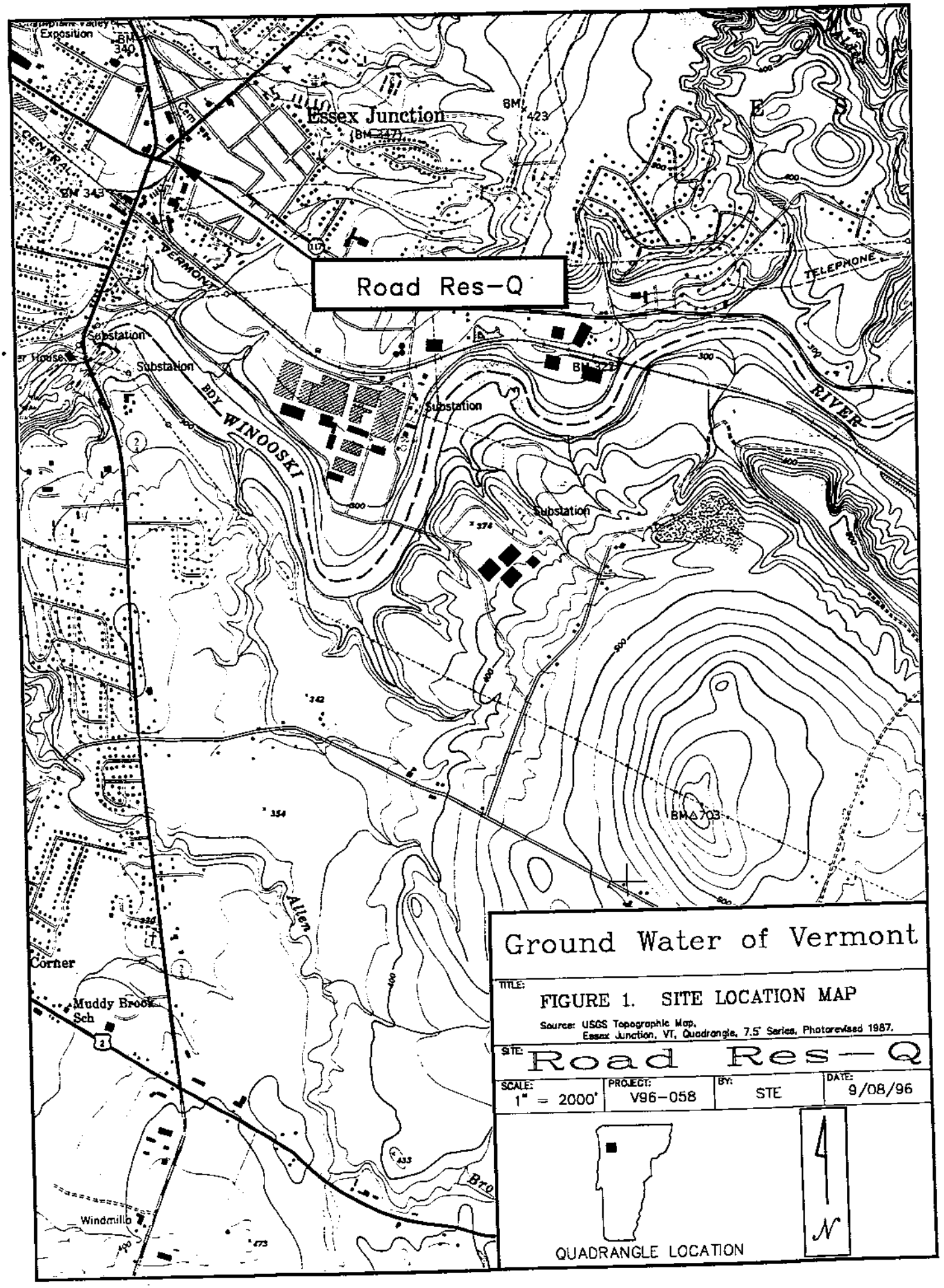
Fetter, C.W., 1994. *Applied Hydrogeology, 3rd Ed.*, Prentice Hall, Englewood Cliffs, New Jersey, 691 p.

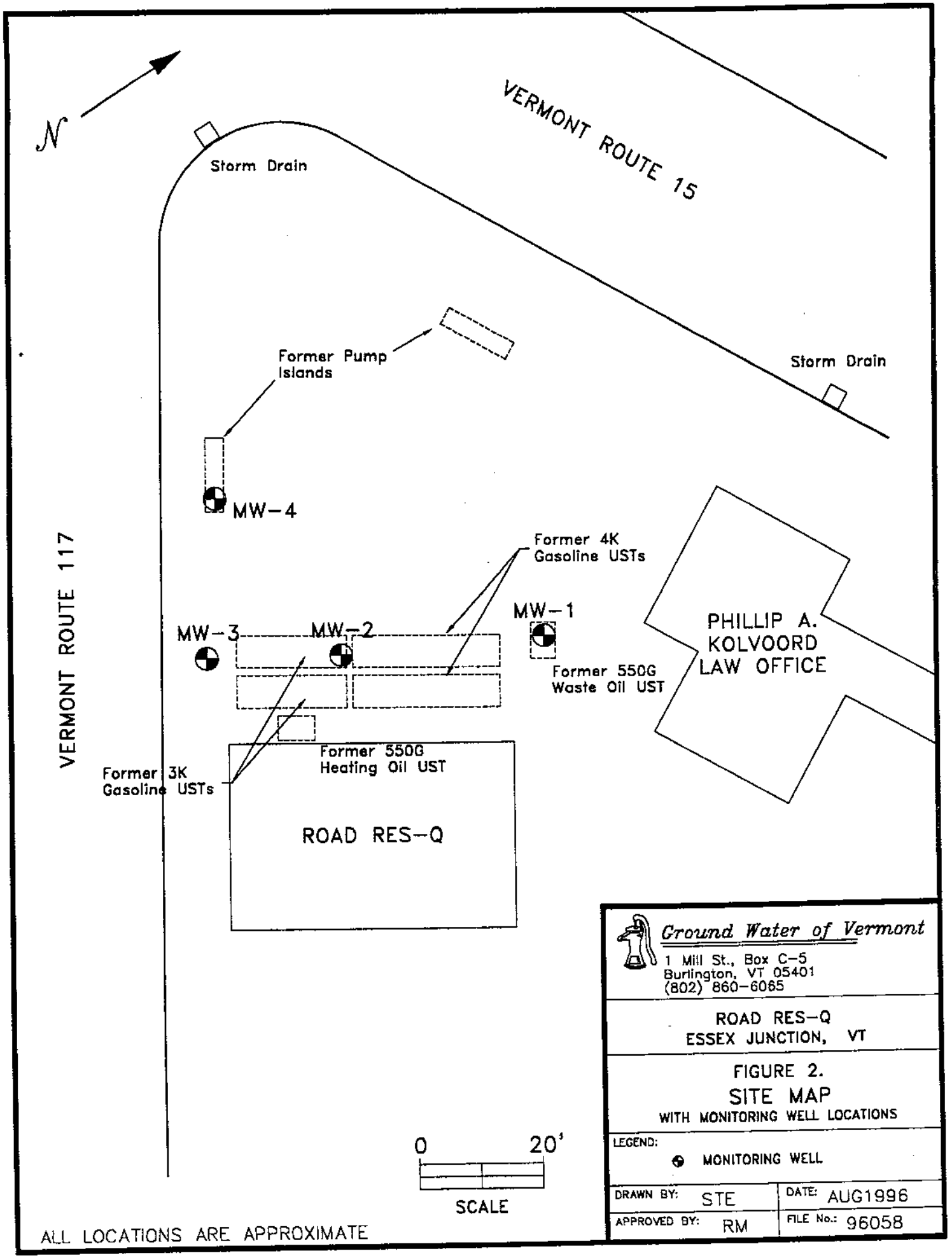
Stewart, D.P. and MacClintock, P., *1970. Surficial Geologic Map of Vermont*, Office of the State Geologist.

Thomas, D.H. and Delfino, J.J., 1991. "*A Gas Chromatic/Chemical Indicator Approach to Assessing Ground Water Contamination By Petroleum Products.*" Ground Water Monitoring & Remediation. pp. 90 - 100. Fall 1991.

APPENDIX A

Figures and Tables


Road Res-Q
Essex Junction
BM 340
BM 343
BM 423
CENTRAL
VERMONT
TELEPHONE
RIVER
BDY
WINOOSKI
Substation
Substation
Substation
Substation
House
BM△703
Allen
Corner
Muddy Brook
Sch
Windmill
Brd
Ground Water of Vermont
TITLE:
FIGURE 1. SITE LOCATION MAP
Source: USGS Topographic Map,
Essex Junction, VT, Quadrangle, 7.5' Series, Photorevised 1987.
SITE: Road Res-Q
SCALE: 1" = 2000'
PROJECT: V96-058
BY: STE
DATE: 9/08/96
QUADRANGLE LOCATION
N



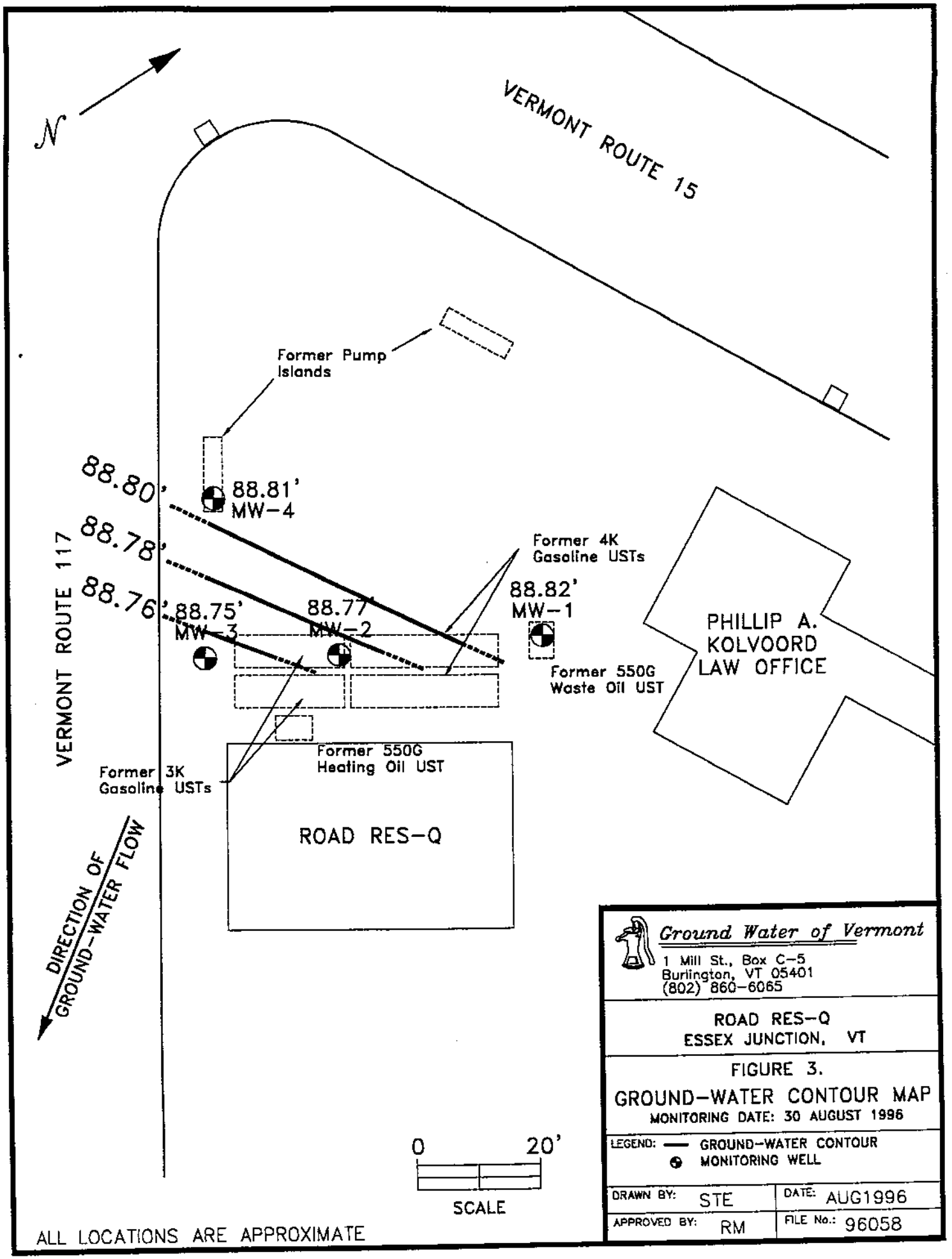
Ground Water of Vermont
1 Mill St., Box C-5
Burlington, VT 05401
(802) 860-6065

ROAD RES-Q
ESSEX JUNCTION, VT

FIGURE 2.
SITE MAP
WITH MONITORING WELL LOCATIONS

LEGEND:
MONITORING WELL

DRAWN BY: STE	DATE: AUG1996
APPROVED BY: RM	FILE No.: 96058



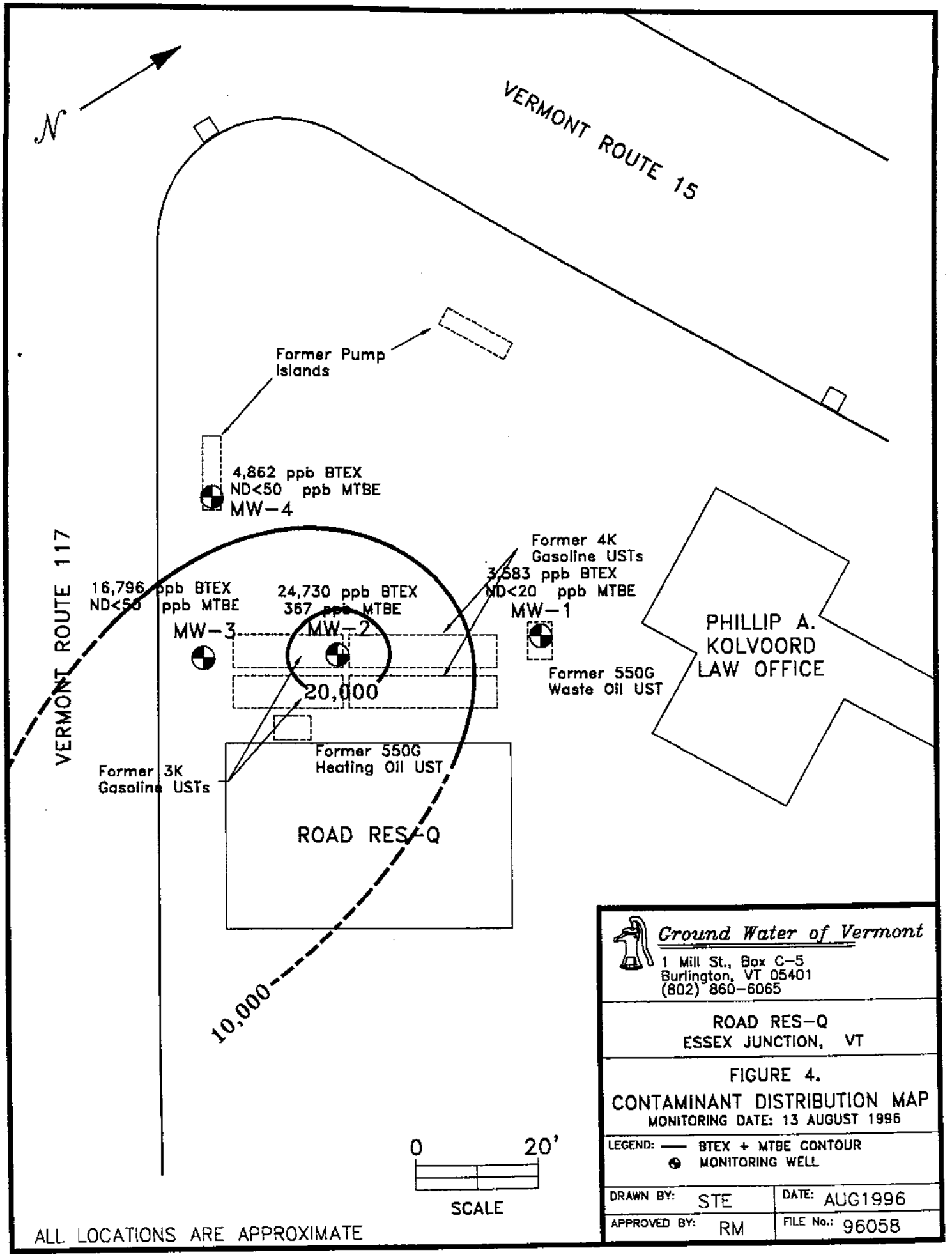
Ground Water of Vermont
1 Mill St., Box C-5
Burlington, VT 05401
(802) 860-6065

ROAD RES-Q
ESSEX JUNCTION, VT

FIGURE 3.
GROUND-WATER CONTOUR MAP
MONITORING DATE: 30 AUGUST 1996

LEGEND: — GROUND-WATER CONTOUR
⊕ MONITORING WELL

DRAWN BY: STE	DATE: AUG1996
APPROVED BY: RM	FILE No.: 96058



Ground Water of Vermont
1 Mill St., Box C-5
Burlington, VT 05401
(802) 860-6065

ROAD RES-Q
ESSEX JUNCTION, VT

FIGURE 4.
CONTAMINANT DISTRIBUTION MAP
MONITORING DATE: 13 AUGUST 1996

LEGEND: —— BTEX + MTBE CONTOUR
⊕ MONITORING WELL

DRAWN BY: STE	DATE: AUG1996
APPROVED BY: RM	FILE No.: 96058

TABLE 1
Ground Water Elevation Calculations
Road Res-Q
Essex Junction, Vermont

Monitoring Date: 30 August 1996

Well I.D.	Top of Casing Elevation	Depth to Product	Depth to Water	Product Thickness	Corrected Depth to water	Water Table Elevation
MW-1	100.00	-	11.18	--	-	88.82
MW-2	98.95	-	10.18	--	-	88.77
MW-3	98.80	--	10.05	--	--	88.75
MW-4	99.23	-	10.42	--	-	88.81

All values reported in feet relative to an arbitrary 100' datum.

Table 2
Summary of Analytical Results
Road Res-Q
Essex Junction, Vermont

	Benzene	Toluene	Ethyl benzene	Xylenes	Total BTEX	MTBE	1-methyl naphthalene	2-methyl naphthalene	naphthalene
MW-01	ND <20	338	465	2,780	3,583	ND <20	39.9	91.7	277
MW-01 dup	ND <20	310	434	2,590	3,334	ND <20	40.4	89.7	251
MW-02	490	7,470	2,270	14,500	24,730	367	NA	NA	NA
MW-03	66	2,390	1,940	12,400	16,796	ND < 50	NA	NA	NA
MW-04	ND < 50	116	896	3,850	4,862	ND <50	NA	NA	NA
trip blank	ND < 1	ND < 1	ND < 1	ND < 1	ND < 1	ND < 1	NA	NA	NA
VGES	5	2,420	680	400	---	40	---	---	20

All samples collected on 13 August 1996 by GWV personnel.

All results reported as parts per billion (ppb).

ND - compound not detected above corresponding detection limit.

NA - sample not analyzed.

TBQ - compound detected at trace level below quantitation limit.

VGES - Vermont Ground Water Enforcement Standard.

APPENDIX B

Soil Boring and Well Construction Logs

Ground Water of Vermont

FIELD SUPERVISOR Brian Starer
CONTRACTOR Adams Engineering
DRILLERS Jerry Adams

JOB LOCATION Road Best Q
DATE 8/5/96

DRILLING METHOD vibratory
BORING DIAMETER 2.375"

AND 40 – 50%
SOME 10 – 40%
TRACE 0 – 10%

BORING LOCATION (sketch on back or on site plan with measurements)

BORING # MW-1

TOTAL DEPTH 17.3'

DEPTH	SAMPLES SAMPLE NUMBER	BLOWS PER 6" 0/6	6/12	12/18	18/24	REC.	SAMPLE DESCRIPTION	STRAT CHG	PID Readings in parts per million (ppm) GENERAL DESCRIPTION
						4.0	medium to fine brown sand and gravel		excavation backfill dry 0-5' - 0.0 ppm pieces of pavement 5-7' - 0.0 ppm 7-10' - 0.1 ppm damp
5'						5.0			
10'						5.0	medium to coarse brown (light) sand		10-15' - 402 ppm ~ water table - gasoline odor sheen soils stained from weathered gasoline (black)
15'						3.0			15-18' - 264 ppm gasoline odor - mixture of old and new
20'							bottom of boring		
25'									
30'									
35'									
40'									

WELL DETAIL: riser; neutral soil; screen; sand

DEPTH: 5', 10', 15', 20', 25', 30', 35'

MATERIALS USED	SIZE/TYPE	QUANTITY
WELL SCREEN	2" / 10' / PVC	10'
SLOT SIZE	0.10 / 2" / PVC	10'
RISER PIPE	2" PVC	7.3'
GRADED SAND	#1	1 gallon
PELLET BENTONITE		
GRANULAR BENTONITE	yes	½ gallon

MATERIALS USED	SIZE/TYPE	QUANTITY
GROUT	yes	
BACKFILL	yes	
WATER USED	no	
STEAM CLEANER	yes	

Ground Water of Vermont

FIELD SUPERVISOR Brian Starer
CONTRACTOR Adams Engineering
DRILLERS Jerry Adams

JOB LOCATION Road Res Q
DATE 8/5/96

DRILLING METHOD vibratory
BORING DIAMETER 2.375"

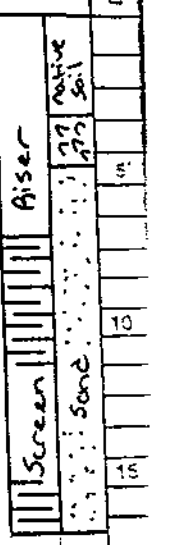
AND 40 – 50%
SOME 10 – 40%
TRACE 0 – 10%

BORING LOCATION sketch on back or on-site plan with measurements

BORING # MW-2
TOTAL DEPTH 16.8'

DEPTH	SAMPLES SAMPLE NUMBER	BLOWS PER 6" (0/6, 6/12, 12/18, 18/24)	REC.	SAMPLE DESCRIPTION	STRAT CHG	PID Readings in parts per million (ppm) GENERAL DESCRIPTION
			5.0	medium to fine light brown sand with a trace of gravel		UST excavation backfill near hole in UST 0-5' - 2.2ppm 5-9' - 409 ppm building debris (wood, bricks concrete) strong gasoline odor 9.5-10' - 403 ppm - out of excavation ~ water table, sheen 10-15' - 279 ppm soils stained black from weathered gasoline 15-19' - 170ppm
5'			5.0			
10'			5.0	medium to coarse brown sand		
15'			4.0			
20'				Bottom of Boring		
25'						
30'						
35'						
40'						

WELL DETAIL



MATERIALS USED	SIZE/TYPE	QUANTITY
WELL SCREEN	2" PVC	10'
SLOT SIZE	0.10"/2" PVC	10'
RISER PIPE	2" PVC	6.5'
GRADED SAND	#1	1 gallon
PELLET BENTONITE		
GRANULAR BENTONITE	yes	1/2 gallon

MATERIALS USED	SIZE/TYPE
GROUT	yes
BACKFILL	yes
WATER USED	no
STEAM CLEANER	yes

Ground Water of Vermont

FIELD SUPERVISOR Brian Starer
CONTRACTOR Adams Engineering
DRILLERS Jerry Adams

JOB LOCATION Road Res Q
DATE 8/5/96

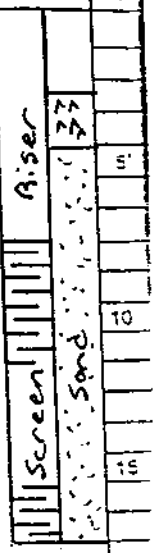
DRILLING METHOD vibratory
BORING DIAMETER 2.375"

AND 40 – 50%
SOME 10 – 40%
TRACE 0 – 10%

BORING LOCATION sketch on back or on-site plan with measurements
BORING # MW-3
TOTAL DEPTH 17'

DEPTH	SAMPLES SAMPLE NUMBER	BLOWS PER 6" 0/6	6/12	12/18	18/24	REC.	SAMPLE DESCRIPTION	STRAT CHG	PID Readings in parts per million (ppm) GENERAL DESCRIPTION
						5.0	medium to fine brown sand with a trace of gravel		0-5' - 3.3 ppm dry 5-7' - 8.4 ppm dry
5'						5.0			
							medium to coarse light brown sand		7-10' - 268 ppm fresh gasoline odor ~ water table, sheen 10-15' - 282 ppm soils stained gray from gasoline soils stained black from older gasoline
10'						5.0			
15'						3.0			15-18' - 183 ppm soils turned brown
							Bottom of Boring		
20'									
25'									
30'									
35'									
40'									

WELL DETAIL



MATERIALS USED	SIZE/TYPE	QUANTITY
WELL SCREEN	2" PVC	10'
SLOT SIZE	0.10 / 2" PVC	10'
RISER PIPE	2" PVC	6.7'
GRADED SAND	#1	1 gallon
PELLET BENTONITE		
GRANULAR BENTONITE	yes	1/2 gallon

MATERIALS USED	SIZE/TYPE	QUANTITY
GROUT	yes	
BACKFILL	yes	
WATER USED	no	
STEAM CLEANER	yes	

Ground Water of Vermont

FIELD SUPERVISOR Brian Storer
CONTRACTOR Adams Engineering
DRILLERS Jerry Adams

JOB LOCATION Road Res-Q
DATE 8/5/96

DRILLING METHOD vibratory
BORING DIAMETER 2.375"

AND 40 - 50%
SOME 10 - 40%
TRACE 0 - 10%

BORING LOCATION (sketch on back or on-site plan with measurements)
BORING # MW-4
TOTAL DEPTH 17.3'

DEPTH	SAMPLES	SAMPLE NUMBER	BLOWS PER 6" (0/6, 6/12, 12/18, 18/24)	REC.	SAMPLE DESCRIPTION	STRAT CHG	PID Readings in parts per million (ppm) GENERAL DESCRIPTION
				5.0	medium to fine reddish-brown sand		0-5' - 4.8 ppm
5'				5.0			5-7.5' 7.2 ppm
					medium to coarse light brown sand		dump - 7.5'± 10' - 46.2 ppm weathered gasoline odor ~ water table, sheen
10'				5.0			10-15' - 252 ppm soils black from old gasoline.
15'				3.0			15-18' - 229 ppm soils turn brown again
20'							
25'							
30'							
35'							
40'							

WELL DETAIL: native soil; Riser; Screen; Sand

MATERIALS USED	SIZE/TYPE	QUANTITY
WELL SCREEN	2" PVC	10'
SLOT SIZE	0.10/2" PVC	10'
RISER PIPE	2" PVC	7'
GRADED SAND	#1	1 gallon
PELLET BENTONITE		
GRANULAR BENTONITE	yes	1/2 gallon

MATERIALS USED	SIZE/TYPE	QUANTITY
GROUT	yes	
BACKFILL	yes	
WATER USED	no	
STEAM CLEANER	yes	

APPENDIX C

Laboratory Report Forms

ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7233

REPORT OF LABORATORY ANALYSIS

CLIENT: GroundWater of Vermont
PROJECT NAME: Road Res-Q
REPORT DATE: August 20, 1996
DATE SAMPLED: August 13, 1996

PROJECT CODE: GWVT1730
REF.#: 92,410 - 92,415

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. Chain of custody indicated sample preservation with HCl.

All samples were prepared and analyzed by requirements outlined in the referenced method and within the specified holding times. All instrumentation was calibrated with the appropriate frequency and verified by the requirements outlined in the referenced method. Blank contamination was not observed at levels affecting the analytical results.

Analytical method precision and accuracy was monitored by laboratory control standards which included matrix spike, duplicate and quality control analyses. These standards were determined to be within established laboratory method acceptance limits.

Individual sample performance was monitored by the addition of surrogate analytes to each sample. All surrogate recovery data was determined to be within laboratory QA/QC guidelines unless otherwise noted.

Reviewed by,

Harry B. Locker, Ph.D.
Laboratory Director

enclosures

ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

LABORATORY REPORT

EPA METHOD 8020--PURGEABLE AROMATICS

CLIENT: GroundWater of Vermont
PROJECT NAME: Road Res-Q
REPORT DATE: August 20, 1996
DATE SAMPLED: August 13, 1996
DATE RECEIVED: August 13, 1996
DATE ANALYZED: August 20, 1996

PROJECT CODE: GWVT1730
REF.#: 92,410
STATION: Duplicate
TIME SAMPLED: Not Indicated
SAMPLER: B. Starer

Parameter	Detection Limit (ug/L)[1]	Concentration (ug/L)
Benzene	20	ND[2]
Chlorobenzene	20	ND
1,2-Dichlorobenzene	20	ND
1,3-Dichlorobenzene	20	ND
1,4-Dichlorobenzene	20	ND
Ethylbenzene	20	434.
Toluene	20	310.
Xylenes	20	2,590.
MTBE	20	ND

Bromobenzene Surrogate Recovery: 95%

NUMBER OF UNIDENTIFIED PEAKS FOUND: >10

NOTES:

1 Detection limit raised due to high levels of contaminants. Sample run at a 5% dilution.

2 None detected

ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

LABORATORY REPORT

EPA METHOD 8020--PURGEABLE AROMATICS

CLIENT: GroundWater of Vermont
PROJECT NAME: Road Res-Q
REPORT DATE: August 20, 1996
DATE SAMPLED: August 13, 1996
DATE RECEIVED: August 13, 1996
DATE ANALYZED: August 20, 1996

PROJECT CODE: GWVT1730
REF.#: 92,411
STATION: MW-1
TIME SAMPLED: 10:00
SAMPLER: B. Starer

Parameter	Detection Limit (ug/L)[1]	Concentration (ug/L)
Benzene	20	ND[2]
Chlorobenzene	20	ND
1,2-Dichlorobenzene	20	ND
1,3-Dichlorobenzene	20	ND
1,4-Dichlorobenzene	20	ND
Ethylbenzene	20	465.
Toluene	20	338.
Xylenes	20	2,780.
MTBE	20	ND

Bromobenzene Surrogate Recovery: 97%

NUMBER OF UNIDENTIFIED PEAKS FOUND: >10

NOTES:

1 Detection limit raised due to high levels of contaminants. Sample run at a 5% dilution.

2 None detected

ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

LABORATORY REPORT

EPA METHOD 8020--PURGEABLE AROMATICS

CLIENT: GroundWater of Vermont
PROJECT NAME: Road Res-Q
REPORT DATE: August 20, 1996
DATE SAMPLED: August 13, 1996
DATE RECEIVED: August 13, 1996
DATE ANALYZED: August 20, 1996

PROJECT CODE: GWVT1730
REF.#: 92,412
STATION: MW-2
TIME SAMPLED: 11:00
SAMPLER: B. Starer

Parameter	Detection Limit (ug/L)[1]	Concentration (ug/L)
Benzene	50	490.
Chlorobenzene	50	ND[2]
1,2-Dichlorobenzene	50	ND
1,3-Dichlorobenzene	50	ND
1,4-Dichlorobenzene	50	ND
Ethylbenzene	50	2,270.
Toluene	50	7,470.
Xylenes	50	14,500.
MTBE	50	367.

Bromobenzene Surrogate Recovery: 96%

NUMBER OF UNIDENTIFIED PEAKS FOUND: >10

NOTES:

1 Detection limit raised due to high levels of contaminants. Sample run at a 2% dilution.

2 None detected

ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

LABORATORY REPORT

EPA METHOD 8020--PURGEABLE AROMATICS

CLIENT: GroundWater of Vermont
PROJECT NAME: Road Res-Q
REPORT DATE: August 20, 1996
DATE SAMPLED: August 13, 1996
DATE RECEIVED: August 13, 1996
DATE ANALYZED: August 20, 1996

PROJECT CODE: GWVT1730
REF.#: 92,413
STATION: MW-3
TIME SAMPLED: 10:40
SAMPLER: B. Starer

Parameter	Detection Limit (ug/L)[1]	Concentration (ug/L)
Benzene	50	66.0
Chlorobenzene	50	ND[2]
1,2-Dichlorobenzene	50	ND
1,3-Dichlorobenzene	50	ND
1,4-Dichlorobenzene	50	ND
Ethylbenzene	50	1,940.
Toluene	50	2,390.
Xylenes	50	12,400.
MTBE	50	ND

Bromobenzene Surrogate Recovery: 100%

NUMBER OF UNIDENTIFIED PEAKS FOUND: >10

NOTES:

1 Detection limit raised due to high levels of contaminants. Sample run at a 2% dilution.

2 None detected

ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

LABORATORY REPORT

EPA METHOD 8020--PURGEABLE AROMATICS

CLIENT: GroundWater of Vermont
PROJECT NAME: Road Res-Q
REPORT DATE: August 20, 1996
DATE SAMPLED: August 13, 1996
DATE RECEIVED: August 13, 1996
DATE ANALYZED: August 20, 1996

PROJECT CODE: GWVT1730
REF.#: 92,414
STATION: MW-4
TIME SAMPLED: 10:20
SAMPLER: B. Starer

Parameter	Detection Limit (ug/L)[1]	Concentration (ug/L)
Benzene	50	ND[2]
Chlorobenzene	50	ND
1,2-Dichlorobenzene	50	ND
1,3-Dichlorobenzene	50	ND
1,4-Dichlorobenzene	50	ND
Ethylbenzene	50	896.
Toluene	50	116.
Xylenes	50	3,850.
MTBE	50	ND

Bromobenzene Surrogate Recovery: 106%

NUMBER OF UNIDENTIFIED PEAKS FOUND: >10

NOTES:

1 Detection limit raised due to high levels of contaminants. Sample run at a 2% dilution.

2 None detected

ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

LABORATORY REPORT

EPA METHOD 8020--PURGEABLE AROMATICS

CLIENT: GroundWater of Vermont
PROJECT NAME: Road Res-Q
REPORT DATE: August 20, 1996
DATE SAMPLED: August 13, 1996
DATE RECEIVED: August 13, 1996
DATE ANALYZED: August 20, 1996

PROJECT CODE: GWVT1730
REF.#: 92,415
STATION: Trip Blank
TIME SAMPLED: 8:00
SAMPLER: B. Starer

Parameter	Detection Limit (ug/L)	Concentration (ug/L)
Benzene	1	ND[1]
Chlorobenzene	1	ND
1,2-Dichlorobenzene	1	ND
1,3-Dichlorobenzene	1	ND
1,4-Dichlorobenzene	1	ND
Ethylbenzene	1	ND
Toluene	1	ND
Xylenes	1	ND
MTBE	1	ND

Bromobenzene Surrogate Recovery: 98%

NUMBER OF UNIDENTIFIED PEAKS FOUND: 0

NOTES:
1 None detected

92,410 — 92,417

GroundWater of Vermont

The Chace Mill, One Mill Street, Box C-5, Burlington, Vermont, 05401
(802)-860-6065 (802)-860-6076 Fax

CHAIN OF CUSTODY RECORD

LABORATORY

ANALYSIS STATUS:
_____ RUSH (2-DAY)
_____ PRIORITY (4-DAY)
_____ BEST AVAILABLE TIME

PROJECT NUMBER: U96-058
PROJECT NAME: Road Res-Q
PROJECT LOCATION: Essex Jct, VT
PROJECT MANAGER: R. Miller
COLLECTED BY: B. Stover
DATE: 8/13/96

GOVT 1730

ANALYSIS REQUESTED

SAMPLE ID	DATE	TIME	SAMPLE MATRIX	TYPE OF CONTAINER	# CONT.	PRESRVD	METALS - PLEASE LIST: MA ( ) EPTOX ( ) (8)	OIL & GREASE: IR ( ) GRAV. ( )	VOLATILE ORGANICS: GX ( ) 601 ( ) 602 ( ) 8010 ( ) 8015 ( ) 8020 BTEX (X)	EXTRACTABLES: ACIDS ( ) BNA ( ) PCBs ( ) PESTS ( ) 608/8080 ( )	TSS ( ) TDS ( ) PH ( ) SPEC COND ( )	BACTERIA: SPC ( ) TOT COLI ( ) FEC COLI ( )	CYANIDE: AMEN ( ) TOT ( )	CL ( ) F ( ) SO4 ( )	NO3 ( ) NO2 ( ) NH3 ( )	TCLP: METALS ( ) VOLATILES ( ) PESTICIDES ( ) SEMIVOLATILES ( ) HERBICIDES ( )	OTHER PAHs by EPA 8100	OTHER	REMARKS
Duplicate	8/13	-	W	VOA + 250 ml glas	3	I/A			X								X		92,410
mw-1		1000A		↓	3				X								X		92,411
mw-2		1100A		VOA	2				X										92,412
mw-3		1040A							X										92,413
mw-4		1020A							X										92,414
Trip Blank	↓	800A	↓	↓	↓	↓			X										92,415

MATRIX
W = AQUEOUS
S = SOLIDS

PRESERVATIVE
I = ICED
A = ACIDIFIED (1:1 HCl 4 drops VOA, 25 drops -250 ml glass)
B = BASE
N = [illegible] BISULFATE

RELINQUISHED BY	DATE	TIME	RECEIVED BY
[signature]	8/13/96	[illegible]	[signature]

92,410 — 92,417

19971

ENDYNE, INC.
32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333

GWVT 1730 / GWVT 1731

CHAIN-OF-CUSTODY RECORD

Project Name: Site Location:	Reporting Address:	Billing Address:
Endyne Project Number: GWVT 1730	Company: Contact Name/Phone #:	Sampler Name: Phone #:

Lab #	Sample Location	Matrix	G R A B	C O M P	Date/Time	Sample Containers		Field Results/Remarks	Analysis Required	Sample Preservation	Rush
						No.	Type/Size				

Relinquished by: Signature	Received by: Signature	Date/Time
Relinquished by: Signature	Received by: Signature	Date/Time

New York State Project: Yes ____ No ____

Requested Analyses

1	pH	6	TKN	11	Total Solids	16	Metals (Specify)	21	EPA 624	26	EPA 8270 B/N or Acid
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	22	EPA 625 B/N or A	27	EPA 8010/8020
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	EPA 418.1	28	EPA 8080 Pest/PCB
4	Nitrite N	9	BOD_5	14	Turbidity	19	BTEX	24	EPA 608 Pest/PCB		
5	Nitrate N	10	Alkalinity	15	Conductivity	20	EPA 601/602	25	EPA 8240		
29	TCLP (Specify: volatiles, semi-volatiles, metals, pesticides, herbicides)										
30	Other (Specify):										

GroundWater of Vermont

The Chace Mill, One Mill Street, Box C-5, Burlington, Vermont, 05401
(802)-860-6065 (802)-860-6076 Fax

CHAIN OF CUSTODY RECORD

LABORATORY

ANALYSIS STATUS:
_____ RUSH (2-DAY)
_____ PRIORITY (4-DAY)
_____ BEST AVAILABLE TIME

PROJECT NUMBER: U96-058
PROJECT NAME: Road Res-9
PROJECT LOCATION: Essex Jct, VT
PROJECT MANAGER: R. Miller
COLLECTED BY: B. Stover
DATE: 8/13/96

ANALYSIS REQUESTED

SAMPLE ID	DATE	TIME	SAMPLE MATRIX	TYPE OF CONTAINER	# CONT.	PRESRVD	METALS - PLEASE LIST: MA ( ) EP-TOX ( ) TC	OIL & GREASE: IR ( ) GRAV. ( )	VOLATILE ORGANICS: 624 ( ) 601 ( ) 602 ( ) 8010 ( ) 8015 ( ) 8020 & MTBE (X)	EXTRACTABLES: ACIDS ( ) BN ( ) PCBs ( ) PESTS ( ) 608/8080	TSS ( ) TDS ( ) pH ( ) SPEC COND ( )	BACTERIA: SPC ( ) TOT COLI ( ) FEC COLI ( )	CYANIDE: AMEN ( ) TOT ( )	CL ( ) F ( ) SO4 ( )	HOD ( ) NO2 ( ) NH3 ( )	TCLP: METALS ( ) VOLATILES ( ) SEMIVOLATILES ( ) PESTICIDES ( ) HERBICIDES ( )	OTHER PAHs by EPA 8100	OTHER	REMARKS
Duplicate	8/13	-	W	VOA + 250 ml glas	3	I/A			X								X		
mw-1	↓	1000A	↓	↓	3	↓			X								X		
mw-2		1100A		VOA	2				X										
mw-3		1040A		↓	↓				X										
mw-4		1020A							X										
Trip Blank	↓	800A	↓	↓	↓	↓			X										

MATRIX
W = AQUEOUS
S = SOLIDS

PRESERVATIVE
I = ICED
A = ACIDIFIED (1:1 HCl 4 drops VOA, 25 drops - 250 ml glass)
B = BASE
N = SODIUM BISULFATE

RELINQUISHED BY	DATE	TIME	RECEIVED BY
[signature]	8/13/96	1112	[signature]

ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-43[illegible]
FAX 879-710[illegible]

REPORT OF LABORATORY ANALYSIS

CLIENT: GroundWater of Vermont
PROJECT NAME: Road Res-Q
DATE REPORTED: August 27, 1996
DATE SAMPLED: August 13, 1996

PROJECT CODE: GWVT1731
REF. #: 92,416 - 92,417

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody record.

Chain of custody indicated proper sample preservation.

All samples were prepared and analyzed by requirements outlined in the referenced methods and within the specified holding times.

All instrumentation was calibrated with the appropriate frequency and verified by the requirements outlined in the referenced methods.

Blank contamination was not observed at levels affecting the analytical results.

Analytical method precision and accuracy was monitored by laboratory control standards which included matrix spike, duplicate and quality control analyses. These standards were determined to be within established laboratory method acceptance limits.

Individual sample performance was monitored by the addition of surrogate analytes to each sample. All surrogate data was determined to be within Laboratory QA/QC guidelines unless otherwise noted.

Reviewed by,

Harry B. Locker, Ph.D.
Laboratory Director

enclosures

ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

LABORATORY REPORT
EPA METHOD 610 BY GC/MS

CLIENT: GroundWater of Vermont
PROJECT NAME: Road Res-Q
REPORT DATE: August 27, 1996
DATE SAMPLED: August 13, 1996
DATE RECEIVED: August 13, 1996
DATE EXTRACTED: August 20, 1996

PROJECT CODE:GWVT1731
ANALYSIS DATE: Augsut 22, 1996
STATION: MW-1
REF. #: 92,417
TIME SAMPLED: 10:00 a.m.
SAMPLER: B. Starer

Parameter	Quantitation Limit (ug/L)	Concentration (ug/L)
Acenaphthene	2	ND[1]
Acenaphthylene	2	ND
Anthracene	2	ND
Benzo(a)anthracene	2	ND
Benzo(b,k)fluoranthene	2	ND
Benzo(a)pyrene	2	ND
Benzo(ghi)perylene	2	ND
Chrysene	2	ND
Dibenzo(a,h)anthracene	2	ND
Fluoranthene	2	ND
Fluorene	2	ND
Indeno(1,2,3-cd)pyrene	2	ND
1-Methylnaphthalene	2	39.9
2-Methylnaphthalene	2	91.7
Naphthalene	2	277.
Phenanthrene	2	ND
Pyrene	2	ND

NUMBER OF UNIDENTIFIED PEAKS: >10

Analytical Surrogate Recovery:

Nitrobenzene-d 5:	99%
2-Fluorobiphenyl:	109%
Terphenyl-d 14:	133%

NOTES:

1 None detected

ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

LABORATORY REPORT
EPA METHOD 610 BY GC/MS

CLIENT: GroundWater of Vermont
PROJECT NAME: Road Res-Q
REPORT DATE: August 27, 1996
DATE SAMPLED: August 13, 1996
DATE RECEIVED: August 13, 1996
DATE EXTRACTED: August 20, 1996

PROJECT CODE:GWVT1731
ANALYSIS DATE: August 22, 1996
STATION: Duplicate
REF. #: 92,416
TIME SAMPLED: Not Indicated
SAMPLER: B. Starer

Parameter	Quantitation Limit (ug/L)	Concentration (ug/L)
Acenaphthene	2	ND[1]
Acenaphthylene	2	ND
Anthracene	2	ND
Benzo(a)anthracene	2	ND
Benzo(b,k)fluoranthene	2	ND
Benzo(a)pyrene	2	ND
Benzo(ghi)perylene	2	ND
Chrysene	2	ND
Dibenzo(a,h)anthracene	2	ND
Fluoranthene	2	ND
Fluorene	2	ND
Indeno(1,2,3-cd)pyrene	2	ND
1-Methylnaphthalene	2	40.4
2-Methylnaphthalene	2	89.7
Naphthalene	2	251.
Phenanthrene	2	ND
Pyrene	2	ND

NUMBER OF UNIDENTIFIED PEAKS: >10

Analytical Surrogate Recovery:

Nitrobenzene-d 5:	85%
2-Fluorobiphenyl:	99%
Terphenyl-d 14:	117%

NOTES:

1 None detected

GroundWater of Vermont

The Chace Mill, One Mill Street, Box C-5, Burlington, Vermont, 05401
(802)-860-6065 (802)-860-6076 Fax

CHAIN OF CUSTODY RECORD

PAGE 1 OF 1

LABORATORY

ANALYSIS STATUS:
_____ RUSH (2-DAY)
_____ PRIORITY (4-DAY)
_____ BEST AVAILABLE TIME

PROJECT NUMBER: U96-058
PROJECT NAME: Road Res-Q
PROJECT LOCATION: Essex Jct, VT
PROJECT MANAGER: R. Miller
COLLECTED BY: B. Stover
DATE: 3/13/96

GWVT1731

ANALYSIS REQUESTED

SAMPLE ID	DATE	TIME	SAMPLE MATRIX	TYPE OF CONTAINER	# CONT.	PRESRVD	METALS - PLEASE LIST: NA ( ) EP-TOX ( ) TCLP ( )	OIL & GREASE: IR ( ) GRAV. ( )	VOLATILE ORGANICS: 624 ( ) 601 ( ) 602 ( ) 8010 ( ) 8015 ( ) 8020 & MTBE (X)	EXTRACTABLES: ACIDS ( ) B-N ( ) PCBs ( ) PESTS ( ) 625/8080	TSS ( ) TDS ( ) SPEC COND ( )	BACTERIA: SPC ( ) TOT COLI ( ) FEC COLI ( )	CYANIDE: AMEN ( ) TOT ( )	CL ( ) F ( ) SO4 ( )	NO3 ( ) NO2 ( ) NH3 ( )	TCLP: METALS ( ) VOLATILES ( ) PESTICIDES ( ) SEMIVOLATILES ( ) HERBICIDES ( )	OTHER: PAHs by EPA 8100	OTHER	REMARKS
Duplicate	3/13	-	W	VOA + 250 ml glas	3	I/A			X								X		92,416
mw-1	↓	1000A	↓	↓	3	↓			X								X		92,417
mw-2		1100A		VOA	2				X										
mw-3		1040A		↓	↓				X										
mw-4		1020A							X										
Trip Blank	↓	300A	↓	↓	↓	↓			X										

MATRIX
W = AQUEOUS
S = SOLIDS

PRESERVATIVE
I = ICED
A = ACIDIFIED (1:1 HCl 4 drops VOA, 25 drops -250 ml glass
B = BASE
N = SODIUM BISULFATE

RELINQUISHED BY	DATE	TIME	RECEIVED BY
[signature]	3/13/96	1111	[signature]

ENDYNE, INC.

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333

19971

CHAIN-OF-CUSTODY RECORD

Project Name: Site Location:	Reporting Address:	Billing Address:
Endyne Project Number: GWVT 1731	Company: Contact Name/Phone #:	Sampler Name: Phone #:

Lab #	Sample Location	Matrix	G R A B	C O M P	Date/Time	Sample Containers		Field Results/Remarks	Analysis Required	Sample Preservation	Rush
						No.	Type/Size				

Relinquished by: Signature	Received by: Signature	Date/Time
Relinquished by: Signature	Received by: Signature	Date/Time

New York State Project: Yes ____ No ____

Requested Analyses

1	pH	6	TKN	11	Total Solids	16	Metals (Specify)	21	EPA 624	26	EPA 8270 B/N or Acid
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	22	EPA 625 B/N or A	27	EPA 8010/8020
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	EPA 418.1	28	EPA 8080 Pest/PCB
4	Nitrite N	9	BOD_5	14	Turbidity	19	BTEX	24	EPA 608 Pest/PCB		
5	Nitrate N	10	Alkalinity	15	Conductivity	20	EPA 601/602	25	EPA 8240		
29	TCLP (Specify: volatiles, semi-volatiles, metals, pesticides, herbicides)										
30	Other (Specify):										